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AN

INAUGURAL DISSERTATION

ON

HYDROCEPHALUS INTERNUS,

SUBMITTED TO THE CONSIDERATION OF

The Honourable Robert Smith, Provost,

AND THE REGENTS

OF THE

UNIVERSITY OF MARYLAND.



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OF FREDERICKSBURG, VIRGINIA.



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TO

DOCTORS CARMICHAEL AND BROWNE,

Of Fredericksburg, Virginia.

GENTLEMEN,

IT is not a compliance with form or custom, that induces me to dedicate to you the following dissertation. I am actuated entirely, by a sense of your deserved and acknowledged merits as physicians, and a grateful recollection of the many proofs I have received, of your friendship. I beg, gentlemen, that you will consider this as an evidence of the sincere regard and esteem of

THE AUTHOR.

Baltimore, April, 1815.

INTRODUCTION.

It may, perhaps, be thought presumption in me, to select from the wide field of medical science, a disease so important, so difficult, and so little understood, as the subject of the present dissertation. But as the limited space of time allotted to me, has prevented me from bestowing that attention to any subject, which would enable me to offer any thing original; I conceived that my exertions could not be more usefully or profitably engaged, than in collecting and condensing in a short essay, what I conceive to be the most correct and approved views and treatment of a disease, which has frequently eluded the skill of the best practitioners, and requires the utmost vigilance and attention to detect it in its commencement.

I am well aware that a treatise, collected and arranged in the space of a few days, must possess many imperfections. But I hope the reader will bear in mind that it is presented to the public in compliance with one of the regulations of the university, rather than from inclination; and view with a lenient eye, any fault he may meet with in its perusal.

DISSERTATION

ON

Hydrocephalus Internus.

HYDROCEPHALUS INTERNUS; or, a Collection of Water within the Cranium, appears to have been noticed by the earliest writers.

Hippocrates speaks of a collection of water between the cranium and dura mater, and Hieronymus Mercurialis, who flourished in the beginning of the sixteenth century, suggests the possibility of an accumulation of water within the ventricles; but adds, that in such a case apoplexy must be the consequence.

Wepfer has collected several cases from different authors, in which water was found in the cavities of the brain; and Boerhaave mentions such a disease as one species of Hydrocephalus.

M. Petit, in a short essay, published in the memoirs of the academy of sciences for the year 1718, observes, he never found water any where within the cranium, but in the ventricles, and therefore supposes the other species of internal Hydrocephali to be very rare. Although Petit has attempted a history of the symptoms of Hydrocephalus, which, doubtless is the most correct of any preceding him; yet we may ascribe the credit to Dr. Whytt, of being the first who gave a correct and methodical arrangement of the symptoms of this disease; which he did in a treatise published in the year 1768. Shortly after, Dr. Fothergill read before the medical society of London, an essay on this subject, in which he

followed pretty closely the view given of it by Dr. Whytt. But it was reserved for Dr. Quin to direct the attention of the medical world, to the true nature of the disease. This gentleman, in a dissertation for a degree in the university of Edinburgh, advanced the opinion, that Hydrocephalus was always preceded by inflammation—Dr. Rush, about the same time, taught the same opinion, and succeeding writers have generally considered it as the correct theory of the disease.

Having premised these observations, we are next led to consider the

Symptoms of Hydrocephalus.

Although many have attempted, yet, none have succeeded, in detailing such an history of the symptoms, as will serve to direct the judgment of the practitioner, in the detection of this insidious and dangerous disease, under the various forms in which it makes its attack. And its acknowledged difficulty precludes the hope of a more successful result in the present essay.

Hydrocephalus is a disease almost exclusively confined to children under the age of twelve or fourteen years. It sometimes, though rarely, attacks adults. It appears more frequently to affect those having the peculiarities of skin, complexion and features, which indicate scrofula. In its commencement, it frequently assumes the appearance of an irregular remittent, but generally before we discover any decided marks of its character; the patient may perhaps complain, for some time of pains in his belly and head, especially on one side, while at the same time he is slightly feverish, languid and inactive, with considerable disorder in all the functions of the abdominal viscera. After these complaints have continued for a short time they are accompanied with frequent attacks of vomiting, particularly upon getting up in the morning. All the symptoms now become increased, the skin becomes hot and dry, the face flushed, the tongue white, the pulse preternaturally frequent and irregular, the pupils of the eyes contracted and impatient of light, the sleep is broken

and frequently interrupted, and the patient starts from it as if affrighted, grinds his teeth and picks his nose; which has induced some writers to consider it a consequence of worms, under the erroneous and too prevalent opinion, even at this period, that, these animals occasion disease. If the sufferer is an infant at the breast, he sucks with avidity or bites the nipple with violence, and moans like one in pain or great distress. The stomach, as before observed, is very early affected. The bowels, though generally costive, are sometimes loose, and in that case the stools are green and fœtid. After the disease has continued under this form for several days, a gradual, or sudden abatement, of the symptoms takes place. The patient becomes drowsy, silent, and listless, the severe head ache and febrile symptoms generally intermit for a time; and the relatives and friends of the unfortunate sufferer are deceived by this insidious calm, into the pleasing expectation of his speedy recovery. The patient notwithstanding cannot bear to be moved or raised, particularly to an erect posture, without making efforts to vomit. He moans heavily, and frequently cries out or screams without being able to assign any cause for it. There is a little stabismus and dilatation of the pupils of the eyes, and perhaps, lethargic torpor or double vision ensues. The patient greedily devours whatever is thrown into his mouth, the costiveness still continues, the pulse becomes slow (beating only sixty in a minute) and unequal, and the breath has now, but particularly in the last stage, a nauseous, offensive smell.

The pleasing remission, just described, which is calculated to revive the drooping hopes of the patient's relatives, is but the too faithful precursor of that stage which is again to reduce them to a state of despondency and eventually bereave them of the object of their care and solicitude. For the exhalent vessels of the brain, now debilitated and relaxed from inflammation and distention, are rendered incapable of performing their natural functions, and pour out an excess of fluid into the ventricles of the brain, which is the cause of the above recited, and apparently favourable change.

The disease may continue under this form for an uncertain length of time, but generally, a few days before its final and fatal termination; the pulse, which for a short period had been as slow, or slower than in health, again returns to the febrile state, becoming uncommonly frequent, and so weak as to be felt and numbered with great difficulty. The skin is dry and hot; the face is sometimes red and hot at one moment, and at the next pale and cold; frequently one cheek is flushed, while the other and the lips remain unaltered. Red spots sometimes appear over the body, particularly about the joints. The pupils now become considerably dilated and vision is entirely lost; the lids, sometimes only one, but generally both, become paralytic, and nearly conceal the eye, which is turned inwards, and so much upwards as to leave a great part of the white visible. The tunica conjunctiva of one or both eyes frequently becomes inflamed a few days before death, coma and delirium succeed, and these are accompanied with convulsions, sometimes of one side only, while the opposite is in a state of more or less paralysis. The patient swallows either with difficulty or not at all. Those who were previously costive now become loose and the urine and feces are passed involuntarily. Lastly the respiration becomes more frequent, laborious and stertorous, as in apoplexy, and a convulsion generally terminates the sufferings of the patient. The duration of this disease is various. Dr. Whytt supposes it to be obscure in its commencement and some months in forming, and that even after the appearance of urgent symptoms, it may be some weeks before it ends fatally, Dr. Fothergill, on the contrary, observes, that he has seen children to all appearance well, healthy and active, seized with this distemper and carried off in about fourteen days. Later writers on the subject, although they bear testimony to the uncertainty of its duration; yet, generally concur in the opinion, that it is seldom protracted beyond the period assigned by Fothergill.

This disease has very properly been divided into three stages, as characterized by the state of the pulse, and the sensibility of the pupils of the eyes. In the

first; the pulse is preternaturally frequent and irregular, tongue white, skin dry and hot, face flushed, and the pupils of the eyes contracted and impatient of the light. In the second stage, there is an intermission of all the most urgent symptoms; the pulse, becomes as slow or slower than in health, and the eyes resume nearly their wonted appearance; although, the patient has great aversion to any kind of exertion and is apt to vomit on being moved. In the third stage, the pulse undergoes another remarkable change, from being slow, it becomes uncommonly frequent and weak, the pupils of the eyes are considerably dilated, vision is destroyed, and there is an alternate pallidness and flushing of the face: The severe pain of the head again returns, accompanied by coma, delirium, convulsions, difficult deglutition, partial paralysis, and frequent and stertorous breathing, which soon closes the painful scene. I will remark here, that it is not to be expected that these stages are to follow each other in the succession and with the regularity of a nosological description, as instances are on record, where children, apparently well, have been seized with convulsions which terminated their existence in a few days. Having concluded an account of the symptoms, it may perhaps be proper to attempt a *Diagnosis*, or to notice some of the diseases, it has been thought necessary to distinguish it from, as, in the early stage, the obscurity of the symptoms and their great resemblance to the commencement of some other complaints, render it equally difficult as it is important to detect it with accuracy. As has been remarked in another part of this essay, in its accession it bears a very great resemblance to the remittent fever; so much so in fact, that it is only by a close and particular attention to the symptoms, that we can discriminate with precision and correctness between the two diseases. But in Hydrocephalus, the remissions are more irregular, there is greater aversion to light and also a peculiar pain of the head, forcing the child to cry out.

The other diseases which it has been supposed to resemble pretty closely, are those said to arise from worms and dentition. And Dr. Cheyne in his essay on this

disease, mentions the suppuration of the bones of the ear; and the symptoms arising from the brain, morbidly sympathizing with those parts of the system, to which it is associated, by an immediate connexion; as two affections presenting us often with many of the characteristics of the early stage of hydrocephalus.

But when we find a patient with a high fever, vomiting, avoiding the light, carrying his hand frequently to his head, starting from his sleep as if affrighted, and if an infant at the breast, moaning and sucking with avidity, we should fear the accession of Hydrocephalus, and take our measures accordingly.

Causes.

Various opinions have been given to the world concerning the causes of Hydrocephalus, the whole of which, previous to the days of Mr. Quin, (who was the first that took a correct view of the subject) were only calculated to mislead the practitioner and prevent the adoption of the only remedies by which the disease could be arrested. I conceive it only necessary to notice one or two of the most remarkable of these opinions, and then proceed to the consideration of what now generally appears to be considered the correct theory of the disease.

Dr. Whytt, supposed the cause of Hydrocephalus to be, a loss of balance between the exhalents and absorbents, and that this change might be produced, either by an original laxity or weakness of the brain, whereby the small exhalent arteries of the ventricles threw out lymph faster than the absorbent veins could imbibe it: Or by a schirrous tumor of the pituitary gland, compressing the neighbouring trunks of the absorbent veins and preventing absorption, or by the blood being in a too thin or watery state. These are the principal causes enumerated by Dr. Whytt.

The next we meet with is that of Dr. Fothergill, who offers it as a conjecture, that it is produced by the rupture of a lymphatic. But I should suppose a cause sufficient to produce such an effect, would so far in-

volve the surrounding parts as to excite considerable inflammation; and that alone, according to the present view of the disease, would be esteemed an adequate cause.

This opinion, as I have before had occasion to remark, was first introduced by Mr. Quin. He having bestowed great attention to the subject himself, and profiting by the investigations of his friends, who had frequent opportunities of dissecting bodies dead of this disease, uniformly found that wherever the symptoms manifested the presence of hydrocephalus, the dissections after death gave unequivocal signs of the existence of inflammation. From hence he was induced to consider it, rather a symptom of another, than a disease of itself; and, that in every instance, inflammation preceded the effusion of water, in the same manner that peripneumony and some times asthma occasion Hydrothorax. This is the theory of disease, now generally entertained, and although few are disposed to doubt its correctness, yet some difference of opinion exists, concerning the seat of the congestion, and the manner in which the inflammation is produced. Dr. Rush, observes, that the disease in its first stage is the effect of causes which produce a less degree of that inflammation which constitutes phrenitis, and in its second stage is the effect of a less degree of that effusion which constitutes serous appoplexy in adults.

Dr. Currie says, that from the appearance of the brain in dissections which have fallen under his notice, and a comparison of the symptoms, which precede and usually attend the first stage of the disease, with those of other affections, of the brain or its membranes he is of opinion, that it partakes more of apoplexy than phrenitis. Mr. Cheyne is of opinion, that in this disease there is produced a *venous* congestion, in addition to, and probably arising from, the increased arterial action; that the effusion of serous fluid arises from the venous congestion; that this effusion has a tendency to counteract the baleful effects of increased action and to retard the fatal termination of the disease; of course that the effusion into the ventricles is not the cause of the violent

symptoms and that the increased action, though, perhaps, varied, does not cease when the congestion and effusion have taken place. These are the principal opinions concerning the seat and causes of Hydrocephalus. But I am disposed to view the disease as a consequence of phrenitis, and am of opinion, it is produced (according to the theory of inflammation lately advanced) by any cause tending to weaken the capillary vessels, by which the balance of power between these and the larger arteries is destroyed. And that by reason of this debility and diminished resistance, they yield to the vis a-tergo, become distended with blood, and finally throw out an excess of fluid into the ventricles, which occasions the effects before related.

Having thus taken a cursory view of the different opinions of the causes of Hydrocephalus; we may fairly conclude, that the predisposing causes are scrophula, imperfect recoveries from fevers, particularly of the eruptive kind, and all diseases which have the effect of debilitating the vessels of the brain. And that the exciting causes are severe concussions of the brain from violent blows and falls on the head, to which children are particularly liable in their youthful gambols.

It now remains for us to notice the

Treatment.

The importance of an early attention to this disease has been before suggested. When therefore, our suspicions are awakened, no time should be lost in ascertaining the real nature of the complaint, and in resorting to such remedies as are calculated to arrest its progress. If after the exhibition of a cathartic, the affection is not removed; and signs of increasing inflammation present themselves, blood-letting must be liberally used, and repeated according to the urgency of the symptoms; as often, and in such quantity as the strength of the patient will justify. As it is of some advantage to abstract blood, from as near the seat of the affection, as can be conveniently done, one of the jugular veins should be opened, or temporal arteries, divided. The

antiphlogistic plan, should be rigorously pursued until all the inflammatory symptoms subside. After having subdued the action of the larger arteries, a blister applied to the head, will be of service, in enabling the weakened vessels to recover their former tone. The strength of the system may now be supported by tonics and such other remedies as have the effect of replacing it in its former healthy condition.

But if, notwithstanding all our exertions, the disease still proceeds and the symptoms become considerably increased, the second stage is soon ushered in. And here, a plan of treatment somewhat different from the former has been pursued, such remedies as are supposed to possess the effect of increasing the tone and power of the exhalents and promoting the action of the absorbents have been exhibited, and from the testimony of many respectable writers and practitioners, with success. But, others of equal celebrity, have not been so fortunate. Dr. Whytt, frankly and ingenuously confesses, he had never been so lucky as to cure one patient, who had those symptoms, which with certainty denote this disease, and adds, that he suspects those who imagine they have been more fortunate, have mistaken another distemper for this. Dr. Fothergill observes, there is much reason to fear, that the most strenuous and well directed endeavours will probably afford no relief. Dr. Davidge, the learned professor of anatomy in the university of Maryland, is decidedly of opinion, that in no instance after the effusion has taken place can it be removed; and I have no hesitation in declaring my conviction of the correctness of his opinion. That this conclusion is just may be inferred from analogy. How often has Hydrocele been removed by the aid of medicine alone? How seldom do we see ascites cured? On this subject Dr. Whytt judiciously remarks, that "an ascites has indeed been cured by diuretics and purgative. But if we consider the distance between the brain and abdomen (where these medicines, by their stimulus, increase in a particular manner the action of the absorbents, at the same time they evacuate the watery part of the blood) the extremely slow motion of the fluids of

the brain, and the pressure of the water on the sides of its ventricles, which must render the absorption of that fluid still more difficult; we shall see the reason why diuretics and cathartics, should be so inefficacious here." The suggestion of Dr. Davidge is also entitled to credit "that the exhalents, in their debilitated state, throw out a fluid, grosser than they do in health, which the delicate absorbents are unable to remove." When together with the reasons above adduced, we take into consideration the nature of the parts concerned, the delicate structure of the brain, the dependence which every part of the system has on it, and the known effect of pressure upon it; we can no longer withhold the inference, that an undue effusion in its ventricles must in every instance cause a fatal termination.

THE END.

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